

Title: Changes in Liver Metabolic Gene Expression from Radiation Exposure

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Abstract:

Radiation exposure is one of the unique physiological challenges of human spaceflight that is not encountered on earth. While radiation exposure is known to impart physiological stresses and alter normal function, it is unclear how it specifically affects drug metabolism. A major concern is that the actions of medications used in spaceflight may deviate from the expectations formed from terrestrial use. This concern was investigated at the molecular level by analyzing how gamma radiation exposure affected gene expression in the livers of mice. Three different doses of radiation were administered and after various intervals of recovery time, gene expression was measured with RT-qPCR screening arrays for drug metabolism and DNA repair. After examining the results of 192 genes total from each of 72 mice, 65 genes were found to be significantly affected by at least one of the doses of radiation. In general, the genes affected are involved in the metabolism of drugs with lipid or steroid hormone-like structures, as well as the maintenance of redox homeostasis and repair of DNA damage.